

Amendments to the Specification

Please delete the title "DESCRIPTION" on page 1.

Please amend the heading before paragraph [0001] as follows:

TECHNICAL FIELD OF THE INVENTION

Please amend paragraphs [0004] and [0005] as follows:

[0004] In recent years, a Positive Temperature Coefficient (PTC) element is used as an a overcurrent protection element in place of the current fuse, and a switch using a PTC element is proposed (see, for example, Japanese Patent Publication No. JP-A-1998-188716 Patent Literature 4). In this type of switch, the PTC element is located within an operating part so that the PTC element is serially connected with the load. More specifically, as to a rotary switch, the PTC element is incorporated in the operating part by embedding a PTC material (PTC resin) in the operating part rotatable in a certain plane and forming a polar plate on an exposed surface of the PTC material (see Fig. 3 in Patent Literature 1). According to this switch construction, there is provided the switch having a function of overcurrent protection, which is not necessarily used in combination with a current fuse.

[0005] The term "PTC material" in the present description means a material having a Positive Temperature Coefficient as is known in the field of the electric/electronic circuit technology. The PTC material has its electric resistance (or an impedance) at a relatively low level under a relatively low temperature condition (e.g. an ordinary or room temperature), but shows show a steep increase in the electric resistance on exceeding a certain temperature (hereinafter referred to as a trip temperature). Throughout the present description, the former state of the PTC material is called "Low state," and the latter state thereof, "High state." Then, the "PTC element" means an element constructed by forming conductive members on a surface of the PTC material at a distance from each other. The conductive members function as electrodes, and are also simply referred to as electrodes or polar plates.

Please delete paragraph [0006].

Please amend the headings before paragraph [0007] as follows:

BRIEF SUMMARY DISCLOSURE OF THE INVENTION
PROBLEMS TO BE SOLVED BY THE INVENTION

Please amend paragraph [0008] as follows:

[0008] On the contrary, in a case of the above-described switch having a function of overcurrent protection, more specifically the rotary switch, the problems as above can be avoided. However, this type of switch incorporates the PTC element in its operating part, and the operating part may have a complicated structure in same kind of the switch, and the size of the operating part is limited to some extent. Therefore, it is difficult to incorporate the PTC element in the operating part for various kinds of switches ~~the switch~~, e.g. a slide switch, a toggle switch and so on. In addition, in the above-described specific construction of the switch having a function of overcurrent protection, the PTC material is embedded in the operating part, and polar plates are formed on the same plane of the PTC material. Therefore, a current flows only in a relatively small volume portion of the PTC material, and the a resistance of the PTC member in a Low state is very high. As a result, there arises another other problem of very small current flowing through the electric circuit at a power ON state. Further, such polar plates are generally attached to the PTC material by thermal compression. When the switching operation which rotates the polar plates while contacting them with the underlying substrate is conducted repeatedly, the polar plate may be detached from the PTC material by friction between the polar plate and the substrate.

Please delete the heading “MEANS FOR SOLVING THE PROBLEMS” before paragraph [0010].

Please amend paragraph [0010] as follows:

[0010] According to one aspect of the present invention, there is provided provide a switch comprising an electrically conductive movable member and at least two terminals and being switchable by mechanically moving the movable member between a state in which the movable member contacts with the two terminals simultaneously and a state in which the movable member is apart from either one of the two terminals, characterized in that at least one of the two terminals comprises (1) an electrically conductive contact part for contacting with the movable member, (2) an electrically conductive connect part for being electrically connected with an external element (e.g. a load or a power supply), and (3) a PTC member sandwiched between the contact part and the connect part.

Please amend paragraphs [0013] to [0015] as follows:

[0013] Since the switch of the present invention incorporates the PTC member in the terminal, the a flexibility of its design is greater higher than a case in which the PTC member is incorporated in the operating part which has many limitations in structure and size. That It is because that the contact part and the connect part of the terminal can be readily changed in form with various metal processing techniques such as metal plate punching processing, plating, sputtering and so on and also can be used run like a lead line, so that the PTC member is incorporated in any available space in the switch. Thus, the present invention can be widely applied to various kinds of switches such as a slide switch, a toggle switch, a rotary switch, a push switch, a rocker switch (or a tumbler switch) and so on. Fundamental structures of these switches excepting the characteristic portion of the present invention are omitted in this description since they are known in the art. However, the characteristics of the present invention will be applicable to various kinds of switches by those skilled in the art based on the present description.

[0014] Furthermore, according to the present invention the PTC member is sandwiched between the conductive contact part and the conductive connect part of the terminal, so that there is no risk of detachment of an electrode for the PTC member. In an example using the PTC member in which a pair of conductive material layers are each located on opposed surfaces of a PTC material layer, the conductive material layers functioning as the electrodes are sandwiched between the PTC material layer and the contact part or the connect part to be free from friction, so that there is no risk of detachment of the electrodes. In another other example in which the PTC member consists of the PTC material layer, since the contact part and the connect part are conductive and function as electrodes themselves, there is no need to additionally provide an electrode(s) and also no risk of detachment of such electrode.

[0015] In addition, according to the present invention, since the PTC member is sandwiched between the contact part and the connect part of the terminal, it is possible to effectively use an area of the PTC member (a so-called chip area, more concretely an area of the opposed surfaces of the PTC material layer). That is, since a pair of the electrodes (more specifically conductive members being able to function as the electrodes) is each located on the opposed surfaces of the PTC material layer, the area of the electrodes can be made larger than those in a case in which the electrodes are located on the same surface. Therefore, the larger volume portion of the PTC material can flow a larger current therethrough, so that the resistance of the PTC material at a

Low state can be lowered to improve the current efficiency at a power ON state. Thus, the present invention attains the higher current efficiency in comparison with the type of a switch having a function of protection where the PTC element is incorporated in its operating part (see Japanese Patent Publication No. JP-A-1998-188716 Patent Literature-1). A ratio of areas of the conductive material layer to the PTC material layer in a contact plane of the PTC material layer with the conductive material layer (or a coverage ratio) is not less than 50%: the larger it becomes, the more preferable: and the most preferably it is almost 100%.

Please amend paragraph [0020] as follows:

[0020] In an example, the switch of the present invention may comprise a first, a second, and a third terminal terminals, and be switchable by mechanically moving the movable member between a state in which the movable member contacts with the first and the second terminals simultaneously and is apart from the third terminal and a state in which the movable member is apart from the first terminal and contacts with the second and the third terminals simultaneously, wherein the second terminal comprises an electrically conductive contact part for contacting with the movable member, an electrically conductive connect part for being electrically connected with an external element, and a PTC member sandwiched between the contact part and the connect part. Such switch is preferably used for switching of electric circuits.

Please delete the heading “EFFECT OF THE INVENTION” before paragraph [0023].

Please amend paragraph [0025] as follows:

[0025]

- 1, 2, 2', 3, 21, 22, 23: terminal
- 2a, 2a': conductive contact part
- 2b, 2b': PTC member
- 2c, 2c', 22c: conductive connect part
- 5, 25: substrate
- 7, 27: operating part
- 9, 29: conductive movable member
- 11, 31: spring
- 12: spacer
- 33: post
- 35: converting element
- 10, 10', 20: switch

Please amend paragraph [0029] as follows:

[0029] The contact part 2a of the terminal 2 is a part for mechanically and electrically contacting with the movable member 9. While not limiting the present invention, the contact part 2a is provided with a projection on its top. The contact part 2a also has right and left edges which downwardly elongate to the surface of the substrate 5 at a distance from the PTC member 2b and the connect part 2c. These right and left edges of the contact part 2a have a sufficient hardness and function as a spacer 12 in the form of a plate. On the other hand, the connect part 2c is a part for being electrically connected with an external element (not shown, e.g. a load or a power supply) by, for example, soldering. As shown in the drawings, the connect part 2c may be in a shape similar to contact parts of the terminals 1 and 3. The contact part 2a and the connect part 2c are both made of a conductive material which is generally a metal material. The contact part 2a and the connect part 2c can be formed appropriately with a general metal processing technique such as metal punching.

Please amend the heading before paragraph [0026] as follows:

DETAILED DESCRIPTION OF BEST MODES FOR CARRYING OUT THE INVENTION

Please amend paragraph [0035] as follows:

[0035] Also by the resilience of the spring 11, a pressing force is applied to the contact part 2a in the thickness direction of the PTC member 2b via the movable member 9. However, according to this embodiment, the pressing force is supported by the right and left edges of the contact part 2a which function as a spacer 12 to decrease a force applied to the PTC member 2b. As a result, it becomes possible to reduce the influence of the pressing force on the PTC characteristics of the PTC member 2b and sufficiently fulfill the function of overcurrent protection.

Please amend paragraph [0040] as follows:

[0040] In place of the right and left edges of the terminal 2a which function as a spacer 12, a spacer being in other form and made of any appropriate material may be used. In other embodiment, the spacer can be omitted if the influence of the external force on the characteristics of the PTC material does not cause a problem.

Please amend paragraph [0046] as follows:

[0046] The terminal 2' is composed of a contact part 2a', a connect part 2c', and a PTC member 2b' sandwiched therebetween. More specifically, the contact part 2a' runs along the substrate 5, and the PTC member 2b' stands on the substrate 5 between the contact part 2a' and the connect part 2c' so that the opposed surfaces of the PTC member 2b' are substantially vertical to the surface of the substrate 5 (see Figs. 2 (b) and (c)). Portions of the contact part 2a' and the connect part 2c' for sandwiching the PTC member 2b' are opposed to each other at a distance corresponding to the thickness of the PTC member 2b' 5, and may function as a plate spring for holding the PTC member 2b' therebetween.

Please delete the heading "INDUSTRIAL APPLICABILITY" before paragraph [0062].